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Effects of the state minimum wages on youth: Evidence from the states of Washington and Connecticut

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Effects of the State Minimum Wages on Youth:

Evidence from the States of Washington and Connecticut

(TITLE)

BY

Zhi Su

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ABSTRACT

Youth aged from 16 to 24 is the group that is most likely to hold minimum wage jobs. A concern of economists and policy makers is: 1) whether the employment opportunities to youth are discouraged by the minimum wage and 2) how the minimum wage influences their choice over work or study. This study advances and combines some ideas from previous studies to examine the effects of the state minimum wages upon youth employment and behavior patterns over school and work. The study concentrates on conditions in the states of Washington and Connecticut during the period of 1998 to 2003, where the state minimum wages not only were higher than the federal minimum wage but continued to increase after 1997 and where the accumulated influence of the state minimum wage could be captured. Individual level datasets from the Current Population Survey (CPS) are used in multi-nominal logistic models to test the probabilities of youth being located in the various school-work categories during the sample period.

Results suggest that an increase of the state minimum wage would probably make youth move out of jobs and enroll in schools. Compared to the minimum wage, individual considerations, such as family background and age, are the stronger determinants for choices of youth. It is implied from this research that the increase of the state minimum wages could have quite different impacts on youth behavior patterns among different states quite likely because of the diverse composition of youth across states.

To My Parent and Sisters

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CHAPTER 1

INTRODUCTION

Since 1997, the federal minimum has remained unchanged while several states have increased their state minimum wage. Among them, the states of Washington and Connecticut kept raising the state minimum wages annually. Especially, the state of Washington indexed the state minimum wage with the price index. This study concerns how the state minimum wages affect choices of youth aged from 16 to 24 over school and work, because they are more likely to hold minimum wage jobs.

In Chapter 2, the standard theoretical model describing the dis-employment effects of the minimum wage is examined. Previous research that focuses on the relationship between the minimum wages and employment of youth in United States is reviewed. The literature review emphasizes selection of models, construction of variables, unique ideas about methodology and results in relevant research.

Chapter 3 reports changes of the state minimum wages and defines four categories of youth based on school and work status. Conditions in the states of Washington and Connecticut about youth' earning, enrollment and working are described. It is hypothesized that the increases of the state minimum wage will change choices of youth over school and work. The minimum wage can be seen from several aspects: increases in nominal value of the state minimum wage; changes in the real value of the state minimum wage; changes of difference between the minimum wage and the average wages; and the speed of increasing the state minimum wage. The hypothesis is tested by two multi-nominal logistic models by incorporating different forms of the minimum wage variables. These two models are distinguished by whether or not the unemployment

variable is included. The individual level datasets used in the models are from the Current Population Survey (CPS) from October 1998 to October 2003. The results of the models suggest that an increase of the state minimum wage probably makes youth move out of jobs and enroll in schools. Compared to the minimum wage, individual consideration, such as the family background and age, are stronger determinants for the choices of youth. It is implied from this research that the increase of state minimum wage could have quite different impacts on youth behavior patterns across states quite likely because of diverse composition of youth across states.

CHAPTER 2

LITERATURE REVIEW

1. Theory about the Minimum Wage

Economists have been doing research on the minimum wage since it took effect. Basically, the discussions are about the effects of the minimum wage on employment. In a perfectly competitive labor market, the equilibrium wage and employment are determined when the supply of workers is equal to the demand of employers. The minimum wage is looked upon by economists as an exogenous factor set by government to disturb the competitive market equilibrium. If the minimum wage is set higher than the equilibrium wage in a perfectly competitive market, employers will have to pay more to workers. To control costs, employers either employ fewer workers or let the same amount of workers work fewer hours. Besides, employers tend to replace now more expensive workers with substitutes such as machines or hire more productive workers. Also sometimes the minimum wage is assumed below the equilibrium wage, so free trades between employers and workers lead to the equilibrium wage contract and result in equilibrium employment. Usually economists establish linear models to detect the effect of the minimum wage on employment. Even though equilibrium wages can not be detected, researchers control other factors that might influence employment except for minimum wage level to observe changes of employment level. One point has to be noticed that increasing the minimum wage this year does not mean lower employment than last year. Theory implies that with a higher minimum wage, employment will be lower than it otherwise might be.

2. Literature About the Effects of the Minimum Wage on Youth Employment

In the history of the federal minimum wage under the Fair Labor Standards Act (FLSA), youth are under the protection of a sub-minimum wage. The 1961 amendment allowed retail and service establishments to employ full-time students at wages of no more than 15 percent below the federal minimum wage with proper certification from the U.S Department of Labor. Later amendments in 1989 established a training wage provision allowing employers to employ youth under the age of twenty at 85% of the minimum wage, but not less than $3.35 an hour. This provision expired in 1993. The recent amendments in 1996 established a youth sub minimum wage of $4.25 an hour for newly hired employees under age 20 during their first 90 consecutive calendar days after being hired by their employer.[1] In 2002, 1.158 million young people aged from 16 to 24 are hourly paid at $5.15 or below $5.15, among whom 605 thousand are under 20. On the other words, 53 percent of workers who are paid at or below the federal minimum wage are under 25 years old.[2]

Some researchers focus on how minimum wage affects employment of youth, for they are groups most likely to hold minimum wage jobs. In United States, a lot of youth work not only during the summer and school vacation, but also after class. They get trained when working, accumulate experience and earn money to pay their bills. The concerns for the economists and policy makers are: 1) whether the employment opportunities to youth are discouraged by the minimum wage and 2) how the minimum wage influences their choice over work or study.

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[1] The brief history of the federal minimum wage is recorded in "History of Changes to the Minimum Wage Law" that can be found in website of the Bureau of Labor Statistics.

[2] Data is from "Characteristics of Minimum Wage Workers: 2002" in the website of the Bureau of Labor Statistics.

Many previous researchers have examined the relationship between minimum wages and employment of youth in United States. Usually, the approach is to use either cross-section data or time-series data in linear models to estimate the effects of the minimum wage on employment.

The cross-section studies rely on the different importance of the minimum wage across geographic areas or industries as the variation of the "minimum wage variable". Early studies use 1960 census data to investigate whether variant state minimum wages lower teenage employment. Or they assume that the effects of the minimum wage depend on the wage level of industries and the extent to which the industries are subject to the minimum wage legislation. They think the minimum wage has less impact in high-wage industries and a stronger impact in low wage industries (Lester, 1946 and Cotterman, 1981). Schiller (1994a) finds that youth aged from 16 to 23 are often exempt from state and federal minimum wage laws because they usually work in small businesses that are not covered by minimum wage laws. In another paper (1994b), he examines the minimum wage dis-employment effects based on differences in state legislation on minimum wages and coverage exemptions. He finds states with no coverage exemptions have lower youth employment rates than states with exemptions.

Cross-section studies have some limitations. First, the federal minimum wage is applied nationwide, only a few states set their own minimum wage. Variation of minimum wage variables is too small to show statistical significance. Second, it is hard to distinguish between the effect of the minimum wage and the average wage since they are combined into a single variable.[3] Third, these studies tend to thoroughly control other

[3] This problem does not merely happen in models using cross-section data, but in those models with "Kaitz index" variable, which is introduced in next paragraph.

determinants of youth employment to produce smaller reduction.[4]

Time-series estimates comprise a more influential part of the earlier minimum-wage literature. In these time-series models, one major key independent variable is the "Kaitz index" developed by Hyman Kaitz in 1971. The " Kaitz index" is defined as the ratio of the minimum wage to the average wage multiplied by coverage. It reflects the combined effects of both the level and the coverage of the minimum wage in a single variable. For example, if the minimum wage increases from $2.00 to $2.20 and covers 10 percent more of non-supervisory employers, the total increase rate is 21 percent.[5] This index was popularly used in similar literature because it captures the combined changes. But this index is also criticized for it does not clearly explain the effects of minimum wage. For example, if a study finds the coefficient of the "Kaitz index" is negative in a model where the employment rate is independent variable, it could be because the employment rate is negatively related to the minimum wage. It could also be because the average wage is positively related to the employment rate while the minimum wage has no effect, since the denominator of this variable is the average wage.

Besides the minimum wage variable, other determinants are considered in models, such as age, race, sex, school enrollment status. Ragan (1977) selects variables based on three considerations. First, the adult male unemployment rate can exhibit a cyclical and seasonal fluctuation of youth employment. Second, a change in relative youth population can alter the supply of youth worker. Third, government manpower programs provide a lot of jobs to enrolled students. Ragan includes these variables into a log-linear model

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[4] These concerns have been discussed in Chapter 2 of "the report of Minimum Wage Study Commission", Volume 1, May 1981.

[5] Minimum wage increase rate= (2.2*1.1)/2-1=0.21

and uses quarterly time-series data over the time period from 1963 first quarter to 1972 third quarter. From his model results, he concludes "Whether measured directly, by a minimum wage variable, or indirectly, by a proxy for relative teenage wages, a higher minimum wage leads to job loss among teenagers. This is most evident for nonwhite males and males not in school." [6]

Brown, Gilrory and Kohen (1981a) find that serial correlation of the residues in OLS estimation is quite evident, so they choose GLS to prove the linear relationship between teenage employment and the minimum wage index. Their work suggests 10 percent increase in the minimum wage would reduce teenage employment by 1.5 to 0.5 percent and "coverage" effects are relatively weaker than "level" effect. In Mattila's paper (1978), sources from the Bureau of Labor Statistics indicates that during 1973 to 1977, on average, ten percent of full-time teenage workers and thirty percent of part-time teenage workers were paid less than the minimum wage. He assumes that youths would spend more time in school than in working, if employers cut jobs due to a minimum wage increase, for the opportunity cost of passively waiting for minimum jobs were very high. His model includes some control variables: the rate of return to school, average real after-tax family income, growth of jobs found in the service sector, sales or agriculture sector and cyclical variation. His statistically significant findings indicates that school enrollment goes up when the minimum wage is increased, the additional amount is almost the same as the loss in not-enrolled employment. Among the non-enrolled, the adverse effect of legal minimum wages is much stronger on full-time workers than on part-time workers. He also suggests further research on the question whether this

[6] See Ragan, "the effect of a Legal Minimum Wage on the Pay and Employment of Teenage Student and Non-students" in "The Economics of Legal Minimum Wages", Washington D.C, AEI, 1979, p38.

increased schooling takes the form of full-time enrollment or enrollment with part-time jobs.

Meyer and Wise (1981) use a quite different approach. They compare a frequency distribution of wages with effects of the minimum wage to a hypothetical distribution without a minimum wage. They think the minimum wage works in these ways: one who is earning less than the minimum wage will be brought up to the minimum wage level or dropped out of employment. Or one with or above the minimum wage level may be increased. Their estimates are considerably larger than the typical estimates.

In the early 1980s, there is a consensus that a 10 percent increase in the minimum wage reduced teen employment by 1 to 3 percent. And the lower end is preferred more, in other words, a ten percentage increase in the minimum wage probably reduce teen employment 1 percent, which is quite small and an insignificant dis-employment effect.

The problems with earlier time-series studies are that they treat schooling of youth as an exogenous factor, that is, school enrollment is used as an independent variable. For their results, an increase of the minimum wage reduces the employment, but if youth leave jobs to go to school, it is hard to conclude that an increase in the minimum wage is not a good policy. So more recent studies investigate how the increase of the minimum wage affects youth's preference over schooling and working.

Early in 1979, Welch and Cunningham compare the schooling and employment of a cohort in each state at 1960 and 1970 by trying to isolate the overall change in both school enrollment and employment attributable to change in the minimum wage during the interim. They choose a conditional polytomous logit function to determine how a change in the minimum wage affects the probability of observing someone in each of

categories. During 1960s and 1970s, the minimum wage legislation only covers parts of industries, so the minimum wage variable is complicated by including both diverse state minimum wage level and coverage. Welch and Cunningham also include a variable measuring schooling quality. A surprising result in their research is that teenagers are less adversely affected within the covered sector than twenty- to-twenty-four-years-olds in the covered sector. They argue that young adults with less experience are more likely to replaced by more productive individuals, such as students working part-time or non-employed students

Similarly, Neumark and Wascher[7] point out that employment and enrollment jointly determine the teenage labor market. Therefore, they use exogenous determinants of enrollment as instrument variables to test the changes of employment. Their panel dataset from CPS covers 50 states and Washington D.C during the period 1977-1989. In an early paper, they use a logit-linear model to do a two-stage least squares estimation, where school expenditures, pupil-teacher ratios, and compulsory schooling laws are used as instrumental variables because they influence enrollment variation but are unrelated to labor market conditions. With elasticity estimates in the range -0.1 to -0.2, they think the minimum wage reduces employment. If the enrollment rate is included, the net dis-employment effects for young adults are even stronger. In their later conditional logit model, they find that when the minimum wage increases, the proportion in school and employed declines with an elasticity of -0.47, and the proportion of idle (not in school and not employed) increase with an elasticity of 0.64. They further develop multinomial

[7] Neumark and Wascher continued publishing a series of paper about the minimum wage on 1994, 1995 and 1996. In their "Reconciling the Evidence on Employment Effects of Minimum Wages--a Review of Our Research Findings", they reviewed their ideas and methodology by answering the inquires from Card and Krueger. This article is published in the book "the Effects of the Minimum Wage on Employment" edited by Marvin H. Kosters, the AEI Press, 1996. Card and Krueger's studies are reviewed later.

logit model to estimate how the minimum wage affects the transition among enrollment-employment status. They find that a minimum wage hike raises the possibility of youth moving from not in school and employed to idleness. The possibility of such transition is higher for blacks and Hispanics or low-wage teenagers.

The latest research about the impact of minimum wage hikes on teens' school enrollment and employment is by Turner and Demiralp (2000). They also consider the interaction of enrollment and employment in the teenage labor market. They use the individual level data from 1990 Survey of Income and Program Participation (SIPP) in a mutli-nominal logit model to estimate the minimum wage impact. Empirical results from their research estimate that the minimum wage increase would increase teenage employment and decrease the probability of teenage to become idle. Besides, the likelihood of teenagers to become idle falls as employed teens' hourly wage increases. Pabilonia (2002) adopted individual-level data from the National Longitudinal Survey of Youth 1997 (NLSY97) to analyze the enrolled and dependent teens' employment behavior and earnings under federal and state minimum wage law. His research results indicate that the employment of young teens is more responsive to the increase of the minimum wage than older teens.

The studies above share some similar characteristics. First, most of the studies use dataset from nation-wide surveys, including CPS and SIPP, but different periods, scopes or levels. Secondly, the variables used to control models cover a wide range because researchers consider the changes of labor market from diverse aspects. Also the estimates of the models are sensitive to the definition of variables. So the selection of dataset and variables that can capture the changes of variables is very important to a model. Third,

through the development of the literature, researchers generally agree that the minimum wage affect both schooling and working activities of youth. Thus, combining the enrollment rate and employment rate into a variable is a better choice to construct models.

When discussing the employment effects of the minimum wage on youth, the research of Card and Krueger (1995) is in sharp contrast with conventional wisdom. They conduct natural experiments to evaluate the effect of the minimum wage. Card and Krueger conduct their own surveys on the fast-food industry in Pennsylvania and New Jersey. Their studies find that when the minimum wage of New Jersey increases from $4.25 to $5.05 on 1994 while that of Pennsylvania remain the same, surprisingly, the employment in fast-food restaurants fell in Pennsylvania while that in New Jersey increased. Their "difference in difference" comparison is straightforward and free of model, even though the generalization of their approach is criticized.

My research follows the conventional approach that use empirical models to estimate the combined schooling and working activity preference under the influence of the minimum wage. Data are drawn from CPS, for they are conveniently available. Adopting comparison idea of Card and Krueger, the study will be narrowed into two states: Washington and Connecticut, where the state minimum wage not only are higher than the federal minimum wage but continued to increase after 1997.

CHAPTER 3

EFFECT OF THE STATE MINIMUM WAGE: EVIDENCE FROM WASHINGTON AND CONNECTICUT

1. The State Minimum Wage

Jobs held by youth are mostly in small businesses, which may be exempted from the federal minimum wage law but are subject to state minimum wage laws, so the state minimum wages are more relevant to students' earning, and further to their school or work behavior (Schiller 1994a). Some economists have pointed out that little or no effect could be found by comparing employment level just prior to and immediately following state minimum wage implementation, since some state minimum wage increases are issued far in advance of implementation (Filer, Hamermesh, Rees 1996). But if the increase of state minimum wages is continuous over years and does make the employment pattern change in some way, the accumulated effects of the state minimum wage could be obvious in regional labor markets. Over the minimum wage history, there is seldom a continuous long time period that the state wage is increased until recent years when the federal minimum wage remained constant while the minimum wage rates of some states continue to increase. This research concentrates on the analysis of youth employment and enrollment condition in the Sates of Washington (brief as Washington in following context) and Connecticut because they are the only two states where the state minimum wages match the assumptions of this research: continuous increase and higher than the federal minimum wage.

Since 1997, the federal minimum wage has been constant at $5.15 per hour, while several states are continuing to raise their state minimum wages, such as Washington and

Connecticut. Connecticut raised its minimum wage to $5.18 per hour from January 1999, to $6.15 from January 2000, to $6.40 from June 2001, to $6.70 from January 2002, and to $6.90 in January 2003. Also the effective minimum wage in Washington is $5.15 in 1998, $5.70 in 1999, $6.5 in 2000, $6.72 in 2001, $6.90 in 2002, and $7.01 in 2003. From January 1, 2001, the minimum wage rate of Washington is adjusted for inflation by calculation using the Consumer Price Index for Urban Wage Earners and Clerical Workers (CPI-W). Washington is the first state in the United States to pass legislation to index the minimum wage with inflation. This legislation is presumed to ensure that the purchasing power of income from minimum wage jobs is not eroded when the nominal federal minimum wage is constant regardless of inflation. By the end of 2003, 12 states set their minimum wage higher than the federal minimum wage (shown in Table 1).

Typically, most people in the age bracket from 16 to 24 have two choices: go to school or go to work. Then they can be categorized into four groups based on combination of choices: in school also employed (SE), in school but not employed (SNE), not in school but employed (NSE), and not in school and not employed (NSNE). [8] Presumably, those originally both enrolled in school and employed are working part-time, and those not enrolled in school but employed are working full-time. Within these categories, the employed includes both full-time employed and part-time employed. When the minimum wage increases, youth will act in several possible ways. The higher minimum wage will provide incentives for them to quit school and work full-time, which is a transition from SE to NSE or SNE to NSE. Some students who originally do not work will seek to work part-time, which is transition from SNE to SE. Some idle youth

[8] These four categories are first suggested by David Neumark and William Wascher (1994). But it is James Cunningham who started to do research on the combination of enrollment and employment under the influence of minimum wage.

begin to seek jobs in labor market and move from NSNE to NSE. These four transitions are shown in Figure 1 by the four arrows under the consideration of youth.

TABLE 1

STATE MINIMUM WAGES

Minimum wage ($)/Year	**Jan 1998**	**Jan1999**	**Jan2000**	**Jan 2001**	**Jan 2002**	**Jan 2003**
Alaska	$5.65	$5.65	$5.65	$5.65	$5.65	$7.15
California	5.15	5.75	5.75	6.25	6.75	6.75
Connecticut	**5.18**	**5.65**	**6.15**	**6.40**	**6.70**	**6.90**
Delaware	5.15	5.15	5.65	6.15	6.15	6.15
The District of Columbia	6.15	6.15	6.15	6.15	6.15	6.15
Hawaii	5.25	5.25	5.25	5.25	5.75	6.25
Massachusetts	5.25	5.25	6.00	6.75	6.75	6.75
Maine	5.15	5.15	5.15	5.15	5.75	6.25
Oregon	6.00	6.50	6.50	6.50	6.50	6.90
Rhode Island	5.15	5.15	5.65	6.15	6.15	6.15
Vermont	5.25	5.25	5.75	6.25	6.25	6.25
Washington	**$5.15**	**$5.70**	**$6.50**	**$6.73**	**$6.90**	**$7.01**

Source: Monthly Labor Review by Bureau of Labor Statistics online, including January 1998, Vol.121, No.1, January 1999, Vol.122, No.1, January 2000, Vol.123, No.1, January 2001, Vol.124, No.1, January 2002, Vol.125, No.1, January 2003, Vol.126, No.1.

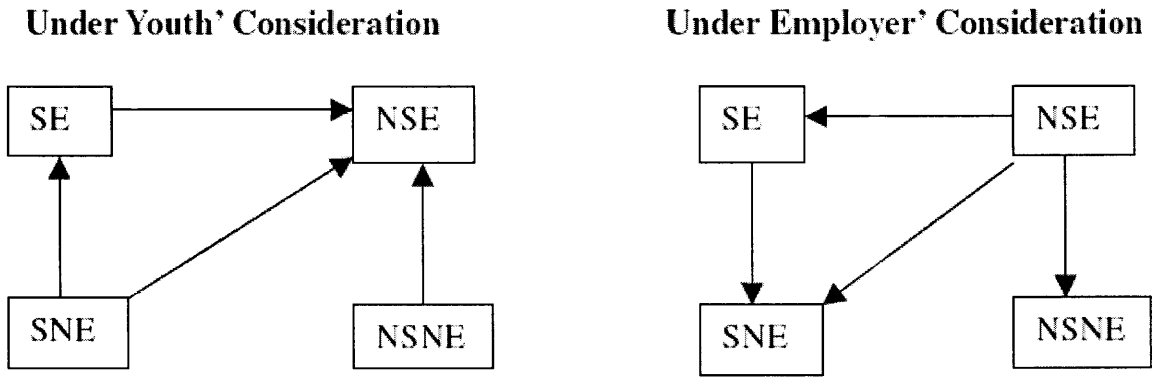
On the other hand, employers have to control costs, so they will either employ fewer workers or reduce the hours that workers can work. So a worker who is originally working full-time but not in school (NSE) would possibly transfer to SE (work less and go to school), SNE (become unemployed and go to school) and NSNE (become idle). And some students would lose their jobs and transfer from SE to SNE.[9] These four transitions are shown by the four arrows under the consideration of employer in Figure 1.

[9] Neumark and Wascher (1995) have already present the six possible transition. But base on my observation, it is quite possible that people will enroll in school after losing their jobs for a while, especially youth in weak labor market.

According to the Figurer 1, the movement under the consideration of youth and that under employer are contradictory, where the youth are attracted to work while the employer cut down the job opportunities and force the youth out of their jobs because of the higher minimum wage. Research is needed to find out which trend is more influential in this dilemma. This study narrow the scope of research on two states, Washington and Connecticut, where there could be stronger phenomenon in the labor market of youth than in the other states of United States due to their continuous state minimum wage increase. If the increases of state minimum wages do have certain significant effects on both employment and enrollment of youth, both Connecticut and state of Washington will show similar transition trends among categories.

FIGURE 1

THE POSSIBLE TRANSITION AMONG FOUR CATEGORIES



Sources: based on research by previous research by David Neumark and William Wascher (1995) and observation.

This analysis begins by describing the changes in the distribution of activities for youth from 16 to 24 years following the state minimum wage change. Then this research extend the approach to examine the impact of the increase on employment and the other outcomes of interest using regression analysis to distinguish observable characteristics.

2. Earning Condition of Youth

(1) Condition in Washington

Because average hourly payment of all occupations is not available in official documentation before 2001, the average weekly wage of waiter and waitress is used to estimate how much low-wage workers are paid on average. Weekly wages in eating and drinking services is used to estimate the average weekly working hours in low-wage industries. The data from the Bureau of Labor Statistics (BLS) shows in Table 2 that both the minimum wage and average wage rose over these years, but the gap between them expanded from 1998 to 2001, then declined from 2002 to 2003. The year 2001 is the turning point when Washington passed legislation to index the state minimum wage with inflation. Before 2001, the minimum wage is around 83% of the average wage, while the percentage is about 77% after 2001. Directly compared the gap between the average wage and the minimum wage, it is at $1 level before 2001 and $2 at and after 2001. This gap indicates that the average wage increased faster than the price index that is reflected in the level of the minimum wage. At the same time, the average weekly working hours in eating and drinking services dropped from over 32 hours before 2001 to about 28 hours after 2002.

The data in Table 3 further suggests that the average wage of the youth increase fast probably and mainly because the state minimum wage is persistently set high. Using the samples from CPS, the fraction of youth earning hourly payment below the federal minimum wage $5.15 and above the latest state minimum wage $7.01 is calculated. Obviously, the fraction of youth paid above $5.15 but below $7.01 is shrinking and more and more youth are paid above the state minimum wage.

TABLE 2

MINIMUM WAGE AND AVERAGE WAGE IN WASHINGTON

Year/Index	1998	1999	2000	2001	2002	2003
Average Wage ($/hour)	$6.16	$6.72	$7.88	$8.91	$8.96	$9.04
Minimum Wage ($/hour)	$5.15	$5.70	$6.50	$6.72	$6.90	$7.01
Weekly Wage	220	236	260	247	256	262
Hours[2]	35.71	35.12	32.99	27.72	28.57	28.98
Gap[3]	$1.01	$1.02	$1.38	$2.19	$2.06	$2.03
Weight[4]	0.836	0.848	0.825	0.754	0.770	0.775

Notes: (1) Source: Bureau of Labor Statistics; (2) Hours=Weekly wage/ average wage
(3) Gap=Average wage-minimum wage; (4) Weight=Minimum wage/ Average

TABLE 3

YOUTH HOURLY PAY AMOUNT IN WASHINGTON

Pay Rate Range/Year	Below and at $5.15 (%)	Above $5.15 and below $7.01 (%)	Above and at $7.01 (%)	Total (%)
1998	9.15	49.64	41.21	100
1999	3.20	46.80	50.00	100
2000	2.76	37.93	59.31	100
2001	3.47	34.93	61.60	100
2002	0.97	29.37	69.66	100
2003	2.38	18.57	79.04	100

Source: Calculated from samples of Current Population Survey

(2) Condition in Connecticut

In Connecticut the average wage of waiters and waitresses also is used as a proxy average wage of low-wage occupations. Over these six years, both states have been annually raising their minimum wage around 6% on average. The average wage for

waiter and waitress in Connecticut has been annually increasing 6.6%, while that in Washington has been growing at 8% on average. Unlike in Washington where the weight of the state minimum wage on the average wage changed significantly after 2001, the minimum wage is floating around 78.3% to 83% of the average wage in Connecticut. What is significant is that waiters or waitresses in Connecticut weekly work more hours than those in Washington, so their weekly income is higher too. Details are in Table 4.

TABLE 4

MINIMUM WAGE AND AVERAGE WAGE IN CONNECTICUT

Year/Index	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**
Average Wage ($/hour)	$6.28	$6.18	$7.94	$8.11	$8.54	$8.58
Minimum Wage ($/hour)	$5.18	$5.65	$6.15	$6.40	$6.70	$6.90
Weekly Wage	246	264	278	285	290	294
Hours[2]	39.17	38.77	35.01	35.14	33.96	34.27
Gap[3]	$1.10	$1.16	$1.79	$1.71	$1.84	$1.68
Weight[4]	0.825	0.830	0.775	0.789	0.785	0.804

Notes: (1) Source: Bureau of Labor Statistics; (2) Hours=Weekly wage/ average wage
(3) Gap=Average wage-minimum wage; (4) Weight=Minimum wage/ Average

TABLE 5

YOUTH HOURLY PAY AMOUNT IN CONNECTICUT

Pay Rate Range	**Below and at $5.15 (%)**	**Above $5.15 and below $6.9 (%)**	**Above and at $6.9 (%)**	**Total (%)**
1998	7.96	42.61	49.43	100
1999	8.98	32.94	58.08	100
2000	6.85	31.58	62.57	100
2001	7.11	26.77	66.22	100
2002	3.45	14.73	81.82	100
2003	5.65	13.09	81.25	100

Source: Calculated from samples of Current Population Survey

Definitely in Connecticut, the youth earn hourly payment above the new state minimum wage increase over these five years. The trends are similar with those in Washington: in 2003, only 13% of youth were paid below $6.90 and above $5.15 and 80% are paid more than the state minimum wage. But what is significant is that it seems higher fraction of youth in Connecticut than in Washington are paid less than the federal minimum wage (see Table 5).

3. Youth employment and enrollment condition

(1) Condition in Washington

In 1998, the Supplemental Appropriation Act granted funds to the Washington Institute for Public Policy to conduct a study of college students' employment.[10] The results of the study report the work pattern of the students. They find that 69% of undergraduate students worked in off-campus employment in 1998. These students are employed in five major industries: eating and drinking establishments, health services, business service, education service, and miscellaneous retail. Detail is shown in Table 6.

Seventeen percent of the students work more than 455 hours during the winter quarter 1998, who can be described as equivalent to full-time employment. Nearly half of the students work less than 260 hours during the winter quarter. This information confirms the assumption that most students enrolled in school are working part-time. Besides, they find that students enrolled part-time are paid hourly more than students enrolled full-time. 85% of the students received financial aid or worked in off-campus employment, so financial aid and off-campus employment are very important sources of

[10] The results of the study are reported to legislature by Edie Harding and Laura Harmon in January 1999. This report is referred for revealing the detail structure of youth enrollment and research in Washington State.

financial support for students attending higher education institutes.

TABLE 6

MAJOR EMPLOYER CLASSIFICATIONS FOR STUDENTS IN WASHINGTON

TYPE OF EMPLOYER	Number of Students Employed	Percent of Students Employed	Pay per Hour
Eating and Drinking	12,812	16%	$6.07
Health Services	5,861	7%	$9.50
Education Service	4,498	6%	$7.82
Miscellaneous Retail	4,404	5%	$6.19
Food Stores	4,292	5%	$6.95
General Merchandise	3,406	4%	$6.70
Social Services	2,851	4%	$6.91
Wholesale Trade	2,785	4%	$8.01
Apparel and Accessories Stores	2,757	3%	$6.37
Amusement and Recreation	2,374	3%	$6.63
Executive, Legislative, General	2,199	3%	$9.02
Engineering and Management	1,650	2%	$9.27
Furniture	1,577	2%	$6.76
Depository Institutions	1,426	2%	$8.49
Automotive	1,374	2%	$6.49

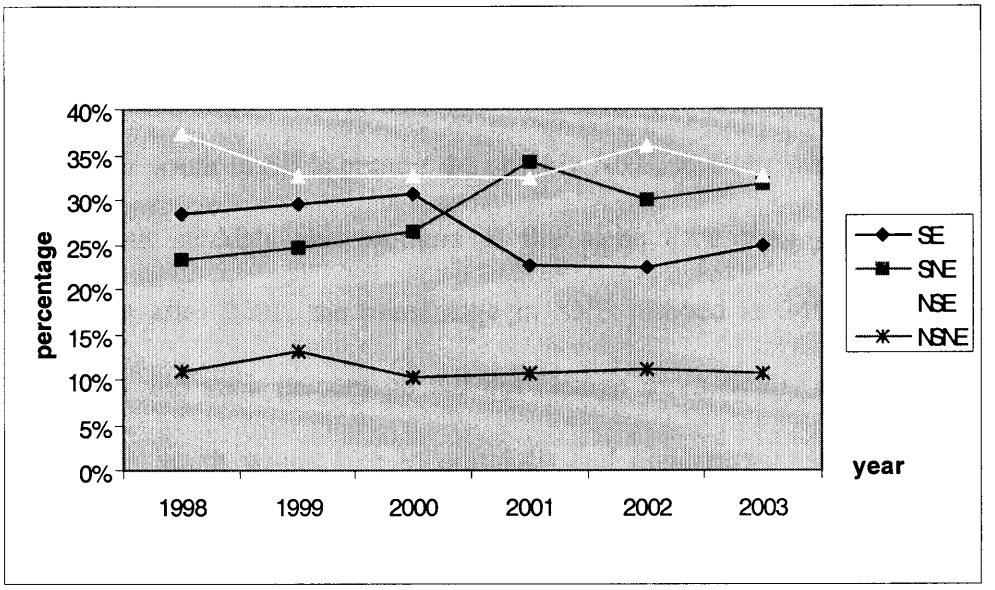
Source: Edie Harding and Laura Harmon "Higher Education Students' Off-Campus Work Patterns" January 1999

The sample of youth in Washington from Current Population Survey from 1998 to 2003 is categorized into four groups as described in previous context. The frequency of these categories in each year is calculated. On average, during these five years, 25.9% of youth in Washington are enrolled in school and employed; 28.9% are in school but do not have jobs; 34.1% are working and drop out of school; and 11.2% are neither in school and not working. The Figure 2 shows how the frequency of the youth in these four groups

changed from 1998 to 2003.

FIGURE 2

ENROLLMENT AND EMPLOYMENT STATUS OF YOUTH IN WASHINGTON



Notes: SE=in school and employed, SNE= in school but not employed, NSE= not in school but employed, NSNE=not in school and not employed.
Sources: Calculated from samples of Current Population Survey

In general, the frequency of the fourth category (NSNE) is almost constant around the average level. Economists define as unemployed "All civilians 16 years old and over are classified as unemployed if they (1) were neither 'at work' nor 'with a job but not at work' during the reference week, and (2) were looking for work during the last 4 weeks, and (3) were available to start a job. Also included as unemployed are civilians who did not work at all during the reference week, were waiting to be called back to a job from which they had been laid off, and were available for work except for temporary illness."[11] So there is distinction between unemployed and out of labor force. Within the NSNE

[11] The definition is used by US Census Bureau, which is published in website: http://www.census.gov/acs/www/UseData/Def/Employme.htm

group, around 8% of youth are totally idle in Washington, who neither go to school or out of labor force.

In Washington, over 30 percent of the youth aged from 16 to 24 work full-time jobs and do not go to school. This percentage is keeping on around 32% during these five years. In these four groups, the trends of SNE and SE are quite interesting. Before 2001, the percentage of youth in SE is greater than that in SNE, in other words, youth are more likely to be both students and workers at the same time than just be students in Washington. But after 2001, the percentage in SNE jumped to 34% while that in SE dropped to 22% and such percentage did not change dramatically afterwards. That is, after 2001, more youth would like to quit jobs and concentrate on their study. Since Washington indexed its state minimum wage in 2001, can it be a coincidence or does this trend reflect the influence of the policy on the pattern of youth behaviors? The question remains in the following analysis on the youth schooling and working activities in Connecticut, which also experienced a continuous raise of state minimum wage although the increase was not indexed.

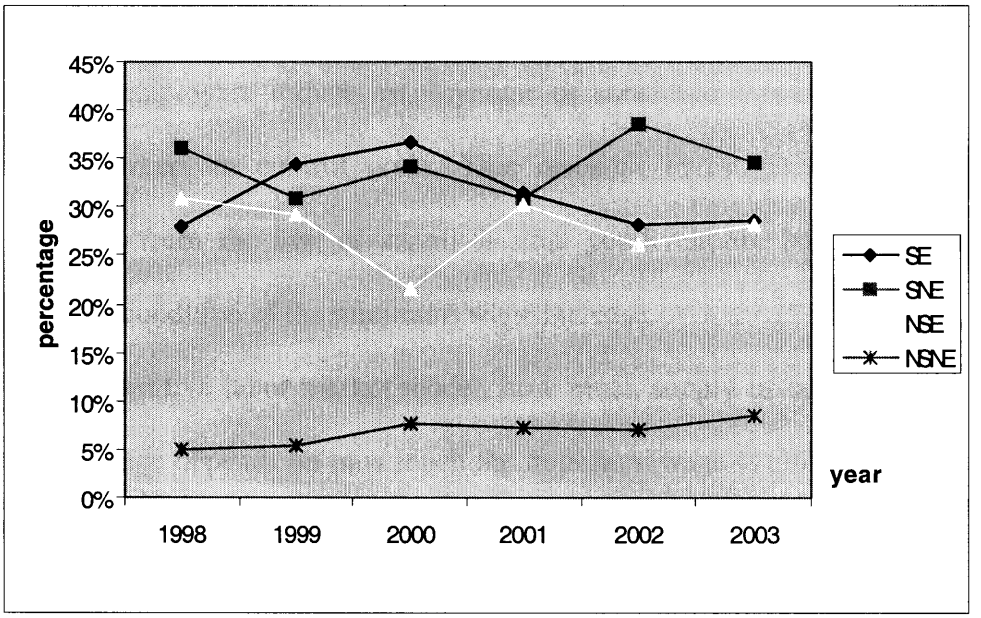
(2) Condition in Connecticut

Other research about youth's status in school and work in Connecticut is rare. The frequency of youth in four categorical groups is also calculated from samples derived from CPS. From 1998 to 2003, on average, about 30.4% of youth in Connecticut enrolled in school and work. 34.6 percent of the youth attended schools and had no intention to work at all. Around 27.9 percent of youth work full time and do not attend schools in any forms. About 7% of youth are completely idle, who do not work and do not study in schools. The ratio of idle hit its highest level among these five years in 2000, which is

8.8% of youth. The percentage of idle youth slightly changed but has an upward tendency over these years. Compared to the condition in Washington, the ratio of youth only working in Connecticut is much less than the same categories in Washington, and even less than the ratio of the other two categories, SE and SNE within Connecticut. The three major groups (SE, SNE, NSE) in Connecticut irregularly fluctuated in time series that is companied by the irregular changes of either weight or gap between the state minimum wage and the average wage, a question raises too: does these irregular change of trends show some kinds of relation?

FIGURE 3

ENROLLMENT AND EMPLOYMENT STATUS OF YOUTH IN CONNECTICUT



Notes: SE=in school and employed, SNE= in school but not employed, NSE= not in school but employed, NSNE=not in school and not employed.
Sources: Calculated from samples of Current Population Survey

When compared from graphs, it is particularly interesting to note that the percentage change of youth enrolled in school but not employed shows a similar trend as the

difference between the state minimum wage and the mean hourly wage in both states. In Washington, when the state minimum wage is far below the mean wage before 2001, a higher percentage of students are reluctant to accept the low wage they are paid, probably minimum wage, and concentrate on their study. After 2001, when the gap between the state minimum wage and the mean wage decreases, the percentage of youth studying but not working begins to decrease, too. In Connecticut, a bigger gap between the minimum wage and the average wage is generally related to a higher percentage of youth who are in school but out of labor force.

4. Hypothesis

Most previous studies consider the effect of the minimum wage mainly from the law of demand---- employers reduce employment or substitute less-skilled workers with high-skilled workers to control costs. This research investigates the effect of the minimum wage from the law of supply--- how youth choose between working and studying on the condition of the minimum wage increase.

In the competitive labor market model, how much supply of labor is influenced by the minimum wage depends on how much the minimum wage is close to the equilibrium wage. This research selects this average wage of waiter and waitress as reference because eating and drinking services are industries youth usually work in and waiter and waitress are occupations they usually hold. So when youth choose to work or not, they will respond to the immediate information they are exposed to.

Previous studies assume that the choice of youth is influenced by the real value of minimum wage, which is built by adjusting the nominal minimum wage with either a

price index or average hourly wage. This research assumes the condition more directly. A young person is only concerned about the nominal wage he can receive, so probably several cents increase in the minimum wage could make him try his best to hold his job, especially when he expects the minimum wage could keep on increasing.

Or when a young person finds a job, he will compare his wage with the wages of other staff working in the same place. If he is paid the minimum hourly wage, which is far less than other, then he will not take the job. He also expects he will earn more after he finishes his study. Because the opportunity cost of studying is low but the expected benefits from studying are high, a rational youth will choose studying over working.

5.Multinomial logistic models

The interest of this research is what is a youth's choice over school and work on the condition that the state minimum wage kept on increasing during period of 1998 to 2003. Since this research groups the youth in Washington and Connecticut based on their schooling and working status and is interested in how the probabilities of the youth in these mutual independent groups is affected by the minimum wage, a multinomial model fits this research.

Multinomial logistic regression is used popularly by economists and sociologists who are interested in classifying phenomena based on a set of variables. Logistic regression applies maximum likelihood method to estimate the probability of a certain event occurring by transferring the dependent into a logit variable. It does not require stringent assumptions about variables. For example, it does not assume linearity of relation between the independent variables and the dependent, does not require normally

distributed variables, and does not assume homoscedasticity. The dependent variables are not restricted to two categories and the independent variables can be categorical or continuous in multinomial logistic regression.[12]

(1) Raw data from Current Population Survey (CPS)

CPS is particularly suited for this analysis because it contains individuals' information about their status, age, gender, race, household composition, and state of residence. The data in various CPS can be accessed from Data Ferret, a joint project between the Bureau of Labor and the US Census Bureau.[13] The individual-level data in this research is from the School Enrollment section of CPS from October 1998 to October 2003. Appendix 2 is the codebook of original variables drew from the CPS Data Ferret.

The number of observations extracted from CPS is listed in Table 7. This dataset will be used to calculate the frequency of schooling and working of youth in Washington and Connecticut from 1998 to 2003. It is also used into a multinomial model to assess the effects of the minimum wage on enrollment and employment of youth.

TABLE 7

TOTAL OBSERVATIONS

State /Year	1998	1999	2000	2001	2002	2003
Washington	201	190	147	225	249	245
Connecticut	100	113	79	178	244	200

(2) The Variables

The dependent variable is schooling and working status. The dependent variable

[12] G. David Garson, "Notes for Quantitative Research in Public Administration" http://www2.chass.ncsu.edu/garson/pa765/logistic.htm

[13] This website describe how to use Data Ferret: http://dataferrett.census.gov/TheDataWeb/index.html. After installed in a personal computer, this software can help users access the basic dataset from a various surveys by US government.

(STATUS) is a categorical variable. The original survey records whether the interviewee is a full-time student, a part-time student, or not-in-universe. This research interprets those not in universe as not enrolled in school. And the original record regarding the working status of the interviewee indicates whether the employed worker is absent or in work, whether the unemployed individual is now laid off or is looking for a job, and the reason why the individual is not in the labor force, such as retired, disabled or other. [14] This research simply divided observations into employed and unemployed (including out of labor force). The categories are listed in Table 8.

TABLE 8

DEFINITION OF DEPENDENT VARIABLE

Value	Definition
1	In school and employed (SE)
2	In school but not employed (SNE)
3	Not in school but employed (NSE)
4	Not in school and not employed (NSNE)

In multinomial logistic model, the dependent variable is transferred to logit of the variable. The probabilities of youth placed in each of these statuses can be calculated from the logit. The last group (NSNE) is used as baseline group. Youth in this group neither go to school nor work. It is the most undesirable outcome for youth. It is helpful to evaluate the function of a factor by looking at the possibilities of other groups relative to the baseline group. In order to estimate the impact of the minimum wage alone, other factors that influence the youth decision process have to be controlled. Some control variables are personal information such as family income (FAMINC), age (AGE), race

[14] More detail information about original samples is in appendix 1.

(RACE) and gender (GENDER).

The average family income (FAMINC) is used as a control variable because it is assumed that youth are getting financial support for their education from their families. Youth would consider their financial condition before they decide to work or study. FAMINC is a household variable that indicates total combined income of all member of the interviewee's family in the past 12 months. A number is assigned to show what income range the interviewee's income is in. For example, 1 means total family income is below $5000. 2 means total family income is from $5000 to $7499 and so on. The highest level of group is represented by 14 that means his family total income is above $75000. So this variable is treated as interval level variable. The categories representing the range of incomes are listed in Table 9.

AGE is an interval level variable that has range from 16 to 24. Age is always a factor that determines the behavior of a youth. The distribution of youths in different economic activities is quite different between youth aged from 14 to 17 and youth aged from 18 to 19 (Mattila, 1981). When a youth is growing older, he becomes more and more likely to seek economic independence and find a job.

Some economists have noticed the divergent trend of employment of white and black male teenagers (Nabeel, Aline and Finis, 1981). In 1978, less than 30 percent of Black male teenagers were employed, while the employment rate for white male teenagers is more than 50 percent. This research adds race as an independent variable to see whether the trend still exists. RACE is a demographics variable that asks about the race of the interviewee. Originally, the survey groups the interviewees as White, Black, American Indian, Asian or Pacific Islander in the survey before 2003. The 2003 CPS recommends

more race categories into this variable. This research only groups observations into Black and non-Black. Black is indicated by 1 and non-Black by 0.

TABLE 9

FAMINC CATEGORIES

Categories	Income range	Categories	Income range
1	Less than $5000	8	$25000-$29999
2	$5000-$7499	9	$30000-$34999
3	$7500-$9999	10	$35000-$39999
4	$10000-$12499	11	$40000-$49999
5	$15000-$19999	12	$50000-$59999
6	$20000-$24999	13	$60000-$74999
7	$25000-$29999	14	$75000 or more

GENDER is a categorical variable where 1 represents male and 0 represents female. The result of previous study shows that unemployment effects caused by the increase of the minimum wage are more often larger for female teenagers than male during the 1970s (Ghellab, 1998). So gender is used as an independent variable to see whether such tendency remains and whether such tendency (out of job) is naturally chosen by female youth even without the increase of the minimum wage.

The effects of the state minimum wage on the behavior patterns of youth are the interest of this research. Based on the hypothesis, several measures of the minimum wage are constructed.

WEIGHT follows conventional method to construct minimum wage variable by using the state minimum wage divided by the average wage. This continuous variable reflects the importance level of the minimum wage in each state. Unlike previous research, this variable does not consider the federal minimum wage level, since this

research only investigates the states of Washington and Connecticut where the state minimum wages are higher than the federal minimum wage during the empirical period and when firms comply to the higher minimum wage. This variable does not include the coverage of the minimum wage too because the number of workers exempted from the minimum wage is very small compared to the state's labor force, so the exemption does not significantly alter the empirical results.[15]

WEIGHT has a disadvantage for it is hard to distinguish effects from the minimum wage and effects from the average wage, since both are combined into a variable. To make it more straightforward, the nominal state minimum wage MIN is used as a variable. This measure is feasible because the minimum wages of both states were varying and other noises such as the limitation of the federal minimum wage and the coverage are insignificant during the sample period. Directly using the nominal value of the state minimum wage as a variable shows the most explicit effect of cent-to-cent change of the minimum wages. MIN is a continuous variable.

This research hypothesizes that what matters in the youth decision probably is the difference between the average wage and the minimum wage---directly comparing the gap. So the difference is expressed in the continuous variable GAP that is constructed by the average wage minus the minimum wage in each state.

Also one aim of this research is to test whether the speed of raising the state minimum wage has an impact on the youth decision on schooling and working. The

[15]According to the Washington Minimum Wage Act (RCW 49.46), the following kinds of employees can be excepted from the minimum wage act: hand-harvest labor, labor employed in a private home, outside salesman, administrative, executive and professional employees, newspaper carriers and so on. According to the Minimum Wage Act in Connecticut, "Minimum fair wage" rate is applied to any industry or occupation in this state. "The rates for learners, beginners, and persons under the age of eighteen years shall be not less than eighty-five per cent of the minimum fair wage for the first two hundred hours of such employment and equal to the minimum fair wage thereafter, except institutional training programs specifically exempted by the commissioner. "

continuous variable GROWTH is constructed by the difference between the state minimum wage in this year and that in previous year dividing the minimum wage in previous year.

(3) The original model

The equation of the original model is:

$$STATUS = \alpha_0 + \alpha_1 AGE + \alpha_2 FIMINC + \alpha_3 RACE + \alpha_4 GENDER + \alpha_5 MW$$

Where,

AGE= age of individual;

FIMINC= average annual total family income of the individual;

RACE= race of the individual;

GENDER= gender of the individual;

MW= Minimum wage variables in different forms, including MIN, GAP, WEIGHT, GROWTH.

For each state, four regressions are run according to different forms of the minimum wage. The regression outcomes of alternative model are shown in the appendix 1.

From the outcome, the minimum wage variables GAP and WEIGHT are significant for the SNE group in 10% significance level in Washington. The coefficient of GAP is 0.377, which means when the average wage is $0.33 higher than the minimum wage (a standard deviation increase of the difference between the state minimum wage and average wage), the odds of youth in school but unemployed (SNE) over inactive (NSNE) will be increased by 45.8% (exp(0.377)-1). And when the coefficient of WEIGHT is –5.252, a standard deviation increase of the weight of the minimum wage over the average wage (0.022) will decrease the odds of SNE (vs.NSNE) by 0.5%. These results

show that when the state minimum wage increases far less than the average wage in Washington, the youth are more likely to enroll in school and do not work. Using further breakdown of categories to run regression to find that the coefficients of GAP and WEIGHT are still significant at 10% level for the group of youth who is enroll as fulltime student and out of labor force (vs. idle).

For Connecticut, the coefficient of MIN is –0.518 for SE and –0.461 for NSE at 10% significance level, which mean that $0.74 increase of the state minimum wage (a standard deviation of the state minimum wage) will lead to 40% (1-exp(-0.518)) decrease of the odd of SE (vs. NSNE) and 36.9% decrease of the odd of NSE(vs. NSNE).

The coefficients of AGE are negative for both SE and SNE while it is positive for NSE at 1% significance level in both Washington and Connecticut. That strongly means when the youth grow older they tend to work rather to enroll in school in both states.

The coefficients of FAMINC are positive for SE, SNE and NSE at 1% significance level in both Washington and Connecticut. That means that when a youth comes from a richer family, he is less likely to be neither in school nor in work, in other words, idle in both states.

RACE is not a significant factor that influences the allocation of youth among these categories in Washington. While the coefficient of non-black factor is positive at 10% significance level, which means that non-black youth are more likely to be employed than black youth in Connecticut.

The coefficient of female factor is negative for NSE, which means during these six years, young girls aged from 16 to 24 years old are less likely to be a full-time worker in Washington. In Connecticut, young girl aged from 16 to 24 years are more likely to enroll

in school no matter they are working or not, for the coefficients of GENDER for SE and SNE are positive.

The speed to increase the state minimum wage (GROWTH) is not a significant factor that influences the tendency of youth's decision over work and school in both and Washington and Connecticut.

(4) Alternative model

In this model, there are two exogenous independent variables: state unemployment rate (UNEMP) and the state minimum wage (MW). The state unemployment rate (UNEMP) represents cyclical and seasonal fluctuations of employment and reflects the toughness of the state labor market (Ragan, 1981). If it is difficult for a youth to find a job, he probably has no other choice but go to school or be idle. According to economic theory, inclusion of state minimum wage as a variable would make the regression more complete and less biased.

The equation of the alternative model is:

$$STATUS = \alpha_0 + \alpha_1 AGE + \alpha_2 FIMINC + \alpha_3 RACE + \alpha_4 GENDER + \alpha_5 UNEMP + \alpha_6 MW$$

Where,

AGE= age of individual;

FIMINC= average annual total family income of the individual;

RACE= race of the individual;

GENDER= gender of the individual;

UNEMP= the state minimum wages

MW= Minimum wage variables in different forms, including MIN, GAP, WEIGHT, GROWTH.

For each state, four regressions are run according to different forms of the minimum wage. The regression outcomes are shown in the appendix 1.

The surprising outcomes of the regression are that both exogenous variables WM (in forms as MIN, GAP, WEIGHT and GROWTH) and UNEMP are insignificant for all the categories in both states while the significance of other independent variable hardly changed. It could be because of the small variation of both WM and UNEMPL during the sample period. Either the state minimum wage (WM) or the state unemployment rate (UNEMP) has only one number for each year, therefore, totally there are only six variations for either of these two variables. While the other variables, such as AGE, GENDER, RACE, and FAMINC, all are in individual level---every observation has a specific value for each property of every individual. Therefore, totally 1257 observations in Washington and 914 observations in Connecticut contain enough information to show statistical significance in the model. Comparing the original model with the alternative model, the significance of GAP and WEIGHT for NSE category in Washington and MIN for SE and SNE in Connecticut changed when the state unemployment rate is included. So the theoretical basis for both models has to be examined to see which one is stronger.

J.C Svenning, an ecologist, discusses model selection in the logistic and logit analysis and suggests, "Sometimes, inclusion of a variable in a model would render a previously selected variable insignificant, but as that variable had already been decided to be the better of the two, in that case the primarily selected variable was kept, and the second was excluded, whether or not it had a significant single effect test. My selection procedure was much more stringent than recommended by Hosmer and Lemeshow (1989) due to the fact that the goal of these analyses was not to find the best model in a

predictive or descriptive sense, but to pick out only strong relationships." (Svenning, 1999 p55)

His discussion points out two facts about logistic models: inclusion of a variable would confuse the significance of another variable and the evaluation and selection of variables serves the goal of the research.

The central concern of this research is to find out the relationship of the MW to the logit of the categories, therefore MW variables that represent different aspects of the state minimum wage are necessary in models. The goal is to figure out the stronger relationship. A guess remains that the insignificance of MW is caused by inclusion of UNEMP, since inclusion of UNEMP makes the significance of other independent variable unchanged but that of MW. Besides, the starting point of the model is the personal decision of individual over school and work based on personal information and directly available information, but the unemployment rate (UNEMP) is a macroeconomic figure that would leaves the model inconsistent. So it hard to reject either of these two models. The original model works because the minimum wage factor is isolated from other exogenous factors to make evident how the minimum wage can affect the probabilities of youth being allocated in school-work categories. The alternative model is sound, because economic theory suggests when the overall macroeconomic environment is tough for youth to find jobs, the behavior pattern of youth will be changed. So neither of these two models is rejected. If results from both models are examined together, the effects of increase of the state minimum wage are ambiguous.

CHAPTER 4

CONCLUSIONS AND IMPLICATION

States of Washington and Connecticut are similar in their rate of increase of their state minimum wage, but the acceleration of their hourly average wage is different, where the average wage is growing faster in Washington than that in Connecticut. The proposition that indexing the minimum wage can maintain its value is doubtful, because the minimum wage as a percentage of the average wage reduces significantly after Washington adopted such a policy in 2001. And this policy seems to meet with a dilemma: on one hand, more and more youth receive an hourly payment higher than the minimum wage legislation requires; on the other hand, employers seem to cut working hours of their employees to control costs when indexing the minimum wage compels the employers to expect higher labor costs in future.

The results of the econometric models find ambiguous effects of the state minimum wage on the decision by the youth over school or work. When the state unemployment rate is included in the model, the state minimum wages have no significant effects on the probabilities of youth being allocated among categories in both states. When the state unemployment rate is excluded from the model, some effects of the minimum wage are shown in some categories, although results are quite different over the same categories in Washington and Connecticut.

According to the original model, results show that youth will go to school and do not work when the gap between the state minimum wage and the average wage is broadened and when the value of the state minimum wage is less important in Washington. This is a reasonable response by youth to the minimum wage constraint. Because when a youth

compares the opportunity cost from jobs with expected returns from education, he will give up working since earnings from jobs are low and the improvement of productivities from education will eventually help the youth out of the low-paying jobs. In Connecticut, the nominal state minimum wage can have an impact on the decisions of youth: an increase of the state minimum wage can make youth move out of jobs, while the relative value of state minimum wage to the average is insignificant over all the categories. For both states, the growth rate of the state minimum wage is not a significant factor to affect the youth's decision.

This research finds similar results as conventional economists predict: an increase of the minimum wage will drive the youth out of work, but they are not becoming idle but rather enroll into school. Some economists say that enrollment in school is a sign to specify whether a worker is highly productive or not, so when the minimum wage increases, employers would substitute unskilled workers with students. This theory is doubted by the results of this research, for when the state minimum wage increases, the odds of employed youth both in school and not in school are decreasing in Connecticut. Generally, students do not have an advantage over other workers in competing for those jobs, for the low-wage jobs do not require very complicated skill. Instead a higher minimum wage attracted a lot of workers to compete for those jobs, youth could lose their jobs because they have less experience.

This research finds that family background and age are stronger factors to determine the choice of youth over school and work. In both states, youth from high-income families are less likely to be idle than those in low-income family. And when youth grow older, they would like to work rather than to study in school, probably because income

from jobs can secure stronger economic independence when youth grow older.

It can be implied from this research that the increase of the state minimum wage could have quite different impacts on youth behavior patterns across different states quite likely because of diverse composition of youth, such as different proportions of race and age subgroup, across states. The increase of the minimum wage could have some stronger impact on some subgroups.

Better-designed models are needed to prove the hypothesis of the study: continuous increase of the state minimum wage could change the behavior patterns of youth over study and work. The insignificance problems of the minimum wage variable and unemployment rate variable in this research may be because of limited data. Further research can extend the sample period or include more states to increase the variation of the minimum wage.

Appendix 1 Models Outcomes

Estimation for Washington with UNEMP variable

Status	Model1	B	Sig.	Model 2	B	Sig.	Model 3	B	Sig.	Model 4	B	Sig.
1	Intercept	4.695	0.003	Intercept	5.313	0.001	Intercept	8.447	0.335	Intercept	5.047	0.000
		(1.582)			(1.560)			(8.763)			(1.448)	
	AGE	-0.281	0.000	AGE	-0.281	0.000	AGE	-0.281	0.000	AGE	-0.281	0.000
		(0.047)			(0.047)			(0.047)			(0.047)	
	FAMINC	0.113	0.000	FAMINC	0.113	0.000	FAMINC	0.113	0.000	FAMINC	0.114	0.000
		(0.025)			(0.025)			(0.025)			(0.025)	
	UNEMP	-0.134	0.508	UNEMP	-0.210	0.549	UNEMP	-0.193	0.543	UNEMP	-0.080	0.528
		(0.202)			(0.350)			(0.317)			(0.127)	
	MIN	0.102	0.724	GAP	0.283	0.682	WEIGHT	-3.473	0.689	GROWTH	-0.270	0.917
		(0.289)			(0.691)			(8.685)			(2.593)	
	RACE=0	0.931	0.141	RACE=0	0.937	0.139	RACE=0	0.936	0.140	RACE=0	0.920	0.146
		(0.633)			(0.633)			(0.633)			(0.633)	
	GENDER=0	-0.015	0.946	GENDER=0	-0.014	0.949	GENDER=0	-0.012	0.955	GENDER=0	-0.009	0.965
		(0.299)			(0.216)			(0.216)			(0.216)	
2	Intercept	8.537	0.000	Intercept	9.823	0.000	Intercept	18.120	0.043	Intercept	8.923	0.000
		(1.649)			(1.612)			(8.933)			(1.506)	
	AGE	-0.533	0.000	AGE	-0.533	0.000	AGE	-0.533	0.000	AGE	-0.533	0.000
		(0.050)			(0.050)			(0.050)			(0.050)	
	FAMINC	0.096	0.000	FAMINC	0.097	0.000	FAMINC	0.098	0.000	FAMINC	0.097	0.000
		(0.026)			(0.026)			(0.026)			(0.026)	
	UNEMP	0.069	0.745	UNEMP	-0.182	0.615	UNEMP	-0.151	0.641	UNEMP	0.176	0.188
		(0.308)			(0.361)			(0.323)			(0.133)	
	MIN	0.162	0.600	GAP	0.719	0.314	WEIGHT	-9.141	0.301	GROWTH	0.378	0.892
		(0.308)			(0.714)			(8.846)			(2.773)	
	RACE=0	0.653	0.296	RACE=0	0.663	0.288	RACE=0	-0.661	0.289	RACE=0	0.646	0.302
		(0.625)			(0.624)			(0.624)			(0.626)	
	GENDER=0	-0.308	0.163	GENDER=0	-0.307	0.164	GENDER=0	-0.303	0.169	GENDER=0	-0.303	0.170
		(0.221)			(0.221)			(0.221)			(0.221)	
3	Intercept	-2.290	0.122	Intercept	-2.280	0.119	Intercept	1.498	0.855	Intercept	-2.200	0.104
		(1.483)			(1.462)			(8.213)			(1.355)	
	AGE	0.161	0.000	AGE	0.161	0.000	AGE	0.161	0.000	AGE	0.160	0.000
		(0.046)			(0.046)			(0.046)			(0.046)	
	FAMINC	0.052	0.025	FAMINC	0.051	0.026	FAMINC	0.051	0.026	FAMINC	0.053	0.023
		(0.023)			(0.023)			(0.023)			(0.023)	
	UNEMP	0.041	0.833	UNEMP	-0.076	0.818	UNEMP	-0.134	0.651	UNEMP	-0.031	0.791
		(0.194)			(0.330)			(0.296)			(0.118)	
	MIN	-0.063	0.818	GAP	0.162	0.804	WEIGHT	-3.979	0.626	GROWTH	-1.352	0.582
		(0.276)			(0.653)			(8.159)			(2.458)	
	RACE=0	0.030	0.951	RACE=0	0.044	0.929	RACE=0	0.049	0.920	RACE=0	0.031	0.950
		(0.276)			(0.491)			(0.491)			(0.490)	
	GENDER=0	-0.627	0.002	GENDER=0	-0.630	0.002	GENDER=0	-0.629	0.002	GENDER=0	-0.622	0.002
		(0.202)			(0.202)			(0.202)			(0.202)	

Estimation for Connecticut with UNEMP variable

Status	Model1	B	Sig.	Model 2	B	Sig.	Model 3	B	Sig.	Model 4	B	Sig.
1	Intercept	4.801	0.032	Intercept	3.431	0.036	Intercept	-3.781	0.579	Intercept	2.563	0.131
		(2.233)			(1.636)			(6.820)			(1.697)	
	AGE	-0.191	0.002	AGE	-0.192	0.002	AGE	-0.193	0.002	AGE	-0.193	0.002
		(0.061)			(0.061)			(0.061)			(0.061)	
	FAMINC	0.248	0.000	FAMINC	0.247	0.000	FAMINC	0.246	0.000	FAMINC	0.245	0.000
		(0.036)			(0.036)			(0.036)			(0.036)	
	UNEMP	-0.080	0.701	UNEMP	-0.206	0.237	UNEMP	-0.263	0.130	UNEMP	-.238	0.294
		(0.208)			(0.572)			(0.173)			(0.227)	
	MIN	-0.456	0.190	GAP	-0.622	0.277	WEIGHT	8.059	0.340	GROWTH	0.401	0.958
		(0.348)			(0.572)			(8.444)			(7.533)	
	RACE=0	0.723	0.089	RACE=0	0.704	0.097	RACE=0	0.695	0.101	RACE=0	0.686	0.105
		(0.425)			(0.425)			(0.424)			(0.424)	
	GENDER=0	0.621	0.038	GENDER=0	0.615	0.040	GENDER=0	0.614	0.040	GENDER=0	0.607	0.042
		(0.299)			(0.299)			(0.299)			(0.298)	
2	Intercept	8.588	0.000	Intercept	7.053	0.000	Intercept	1.249	0.854	Intercept	6.425	0.000
		(2.208)			(1.620)			(6.790)			(1.673)	
	AGE	-0.352	0.000	AGE	-0.353	0.000	AGE	-0.353	0.000	AGE	-0.354	0.000
		(0.062)			(0.062)			(0.062)			(0.062)	
	FAMINC	0.199	0.000	FAMINC	0.197	0.000	FAMINC	0.197	0.000	FAMINC	0.196	0.000
		(0.035)			(0.035)			(0.035)			(0.035)	
	UNEMP	0.096	0.644	UNEMP	-0.039	0.822	UNEMP	-0.088	0.611	UNEMP	-0.090	0.689
		(0.208)			(0.174)			(0.173)			(0.225)	
	MIN	-0.471	0.172	GAP	-0.554	0.330	WEIGHT	6.395	0.447	GROWTH	-0.748	0.920
		(0.345)			(0.568)			(8.412)			(7.463)	
	RACE=0	0.034	0.931	RACE=0	0.013	0.974	RACE=0	0.003	0.994	RACE=0	-0.001	0.998
		(0.392)			(0.392)			(0.391)			(0.391)	
	GENDER=0	0.491	0.098	GENDER=0	0.488	0.100	GENDER=0	0.488	0.100	GENDER=0	0.481	0.105
		(0.297)			(0.297)			(0.297)			(0.296)	
3	Intercept	-4.749	0.036	Intercept	-6.262	0.000	Intercept	-15.47	0.025	Intercept	-7.020	0.000
		(2.270)			(1.629)			(6.916)			(1.771)	
	AGE	0.331	0.000	AGE	0.330	0.000	AGE	0.331	0.000	AGE	0.329	0.000
		(0.062)			(0.062)			(0.062)			(0.062)	
	FAMINC	0.152	0.000	FAMINC	0.151	0.000	FAMINC	0.150	0.000	FAMINC	0.150	0.000
		(0.034)			(0.034)			(0.034)			(0.034)	
	UNEMP	0.070	0.738	UNEMP	-0.070	0.692	UNEMP	-0.140	0.424	UNEMP	-0.159	0.485
		(0.211)			(0.575)			(0.175)			(0.228)	
	MIN	-0.523	0.135	GAP	-0.768	0.182	WEIGHT	10.324	0.255	GROWTH	-2.025	0.789
		(0.350)			(0.575)			(8.501)			(7.581)	
	RACE=0	0.830	0.051	RACE=0	0.816	0.055	RACE=0	0.809	0.057	RACE=0	0.795	0.060
		(0.425)			(0.425)			(0.425)			(0.423)	
	GENDER=0	0.158	0.596	GENDER=0	0.152	0.612	GENDER=0	0.150	0.618	GENDER=0	0.146	0.626
		(0.300)			(0.300)			(0.300)			(0.299)	

Estimation for Washington without UNEMP variable

Status	Model1	B	Sig.	Model 2	B	Sig.	Model 3	B	Sig.	Model 4	B	Sig.
1	Intercept	4.939	0.001	Intercept	4.746	0.000	Intercept	3.368	0.192	Intercept	4.515	0.000
		(1.534)			(1.241)			(2.582)			(1.193)	
	AGE	-0.281	0.000	AGE	-0.281	0.000	AGE	-0.281	0.000	AGE	-0.281	0.000
		(0.047)			(0.047)			(0.047)			(0.047)	
	FAMINC	0.113	0.000	FAMINC	0.113	0.000	FAMINC	0.113	0.000	FAMINC	0.113	0.000
		(0.025)			(0.025)			(0.025)			(0.025)	
	MIN	-0.060	0.692	GAP	-0.112	0.593	WEIGHT	1.495	0.605	GROWTH	0.634	0.771
		(0.151)			(0.209)			(2.891)			(2.180)	
	RACE=0	0.924	0.144	RACE=0	0.922	0.145	RACE=0	0.924	0.145	RACE=0	0.941	0.137
		(0.633)			(0.633)			(0.633)			(0.633)	
	GENDER=0	-0.008	0.972	GENDER=0	-0.009	0.966	GENDER=0	-0.010	0.964	GENDER=0	-0.010	0.962
		(0.215)			(0.215)			(0.215)			(0.216)	
2	Intercept	8.376	0.000	Intercept	9.333	0.000	Intercept	14.145	0.000	Intercept	10.083	0.000
		(1.594)			(1.284)			(2.692)			(1.235)	
	AGE	-0.533	0.000	AGE	-0.533	0.000	AGE	-0.533	0.000	AGE	-0.533	0.000
		(0.50)			(0.050)			(0.050)			(0.050)	
	FAMINC	0.097	0.000	FAMINC	0.097	0.000	FAMINC	0.097	0.000	FAMINC	0.097	0.000
		(0.26)			(0.026)			(0.026)			(0.026)	
	MIN	0.251	0.116	GAP	0.377	0.084	WEIGHT	-5.252	0.080	GROWTH	-1.715	0.452
		(0.16)			(0.218)			(3.002)			(2.282)	
	RACE=0	0.652	0.296	RACE=0	0.653	0.296	RACE=0	0.651	0.297	RACE=0	0.613	0.324
		(0.624)			(0.625)			(0.624)			(0.622)	
	GENDER=0	-0.308	0.162	GENDER=0	-0.303	0.169	GENDER=0	-0.301	0.172	GENDER=0	-0.298	0.177
		(0.22)			(0.221)			(0.221)			(0.221)	
3	Intercept	-2.366	0.100	Intercept	-2.481	0.033	Intercept	-2.041	0.404	Intercept	-2.399	0.033
		(1.438)			(1.167)			(2.446)			(1.123)	
	AGE	0.161	0.000	AGE	0.161	0.000	AGE	0.161	0.000	AGE	0.160	0.000
		(0.046)			(0.046)			(0.046)			(0.046)	
	FAMINC	0.051	0.026	FAMINC	0.051	0.026	FAMINC	0.051	0.026	FAMINC	0.052	0.024
		(0.023)			(0.023)			(0.023)			(0.023)	
	MIN	-0.013	0.926	GAP	0.020	0.921	WEIGHT	-0.511	0.852	GROWTH	-1.015	0.626
		(0.142)			(0.198)			(2.739)			(2.082)	
	RACE=0	0.036	0.942	RACE=0	0.038	0.937	RACE=0	0.039	0.936	RACE=0	0.035	0.943
		(0.491)			(0.49)			(0.490)			(0.49)	
	GENDER=0	-0.629	0.002	GENDER=0	-0.628	0.002	GENDER=0	-0.627	0.002	GENDER=0	-0.621	0.002
		(0.202)			(0.202)			(0.202)			(0.202)	

Estimation for Connecticut without UNEMP variable

Status	Model1	B	Sig.	Model 2	B	Sig.	Model 3	B	Sig.	Model 4	B	Sig.
1	Intercept	4.928 (2.155)	0.022	Intercept	2.906 (1.562)	0.063	Intercept	-3.465 (6.654	0.603	Intercept	1.445 (1.313)	0.271
	AGE	-0.193 (0.061)	0.002	AGE	-0.193 (0.061)	0.001	AGE	-0.193 (0.061)	0.001	AGE	-0.192 (0.061)	0.002
	FAMINC	0.247 (0.036)	0.000	FAMINC	0.244 (0.036)	0.000	FAMINC	0.243 (0.036)	0.000	FAMINC	0.245 (0.036)	0.000
	MIN	-0.518 (0.279)	0.062	GAP	-0.747 (0.561)	0.183	WEIGHT	6.491 (8.171)	0.427	GROWTH	5.576 (5.673)	0.326
	RACE=0	0.714 (0.425)	0.093	RACE=0	0.681 (0.424)	0.108	RACE=0	0.660 (0.422	0.118	RACE=0	0.653 (0.422)	0.122
	GENDER=0	0.626 (0.299)	0.036	GENDER=0	0.625 (0.299)	0.036	GENDER=0	0.626 (0.298)	0.036	GENDER=0	0.610 (0.298)	0.041
2	Intercept	8.387 (2.143)	0.000	Intercept	6.924 (1.546)	0.000	Intercept	1.417 (6.585)	0.828	Intercept	5.998 (1.287)	0.000
	AGE	-0.352 (0.062)	0.000	AGE	-0.352 (0.062)	0.000	AGE	-0.352 (0.062)	0.000	AGE	-0.354 (0.062)	0.000
	FAMINC	0.199 (0.035)	0.000	FAMINC	0.197 (0.035)	0.000	FAMINC	0.197 (0.035)	0.000	FAMINC	0.197 (0.035)	0.000
	MIN	-0.382 (0.277)	0.168	GAP	-0.575 (0.557)	0.302	WEIGHT	5.747 (8.092)	0.478	GROWTH	1.063 (5.636)	0.850
	RACE=0	0.036 (0.392)	0.927	RACE=0	0.011 (0.391)	0.979	RACE=0	-0.005 (0.390	0.990	RACE=0	-0.012 (0.330	0.975
	GENDER=0	0.489 (0.297)	0.099	GENDER=0	0.487 (0.297)	0.101	GENDER=0	0.485 (0.296)	0.102	GENDER=0	0.482 (0.296	0.104
3	Intercept	-4.877 (2.204)	0.027	Intercept	-6.465 (1.629)	0.000	Intercept	-15.23 (6.730)	0.024	Intercept	-7.780 (1.408)	0.000
	AGE	0.330 (0.062)	0.000	AGE	0.330 (0.062)	0.000	AGE	0.331 (0.062)	0.000	AGE	0.329 (0.062)	0.000
	FAMINC	0.152 (0.034)	0.000	FAMINC	0.150 (0.034)	0.000	FAMINC	0.149 (0.034)	0.000	FAMINC	0.150 (0.034)	0.000
	MIN	-0.461 (0.281)	0.100	GAP	-0.809 (0.564)	0.151	WEIGHT	9.365 (8.202)	0.254	GROWTH	1.340 (5.727)	0.815
	RACE=0	0.831 (0.425)	0.050	RACE=0	0.811 (0.424)	0.056	RACE=0	0.796 (0.423	0.06	RACE=0	0.777 (0.422)	0.056
	GENDER=0	0.158 (0.300)	0.598	GENDER=0	0.153 (0.300)	0.609	GENDER=0	0.150 (0.300)	0.617	GENDER=0	0.148 (0.299)	0.622

Appendix 2

DATAFERRETT CODEBOOK

PESCHFT: School Enrollment-full-time/part-time student
With the following Ranges:
-1 Not in Universe
1 Full-time
2 Part-time

PERACE: Demographics-race of respondent (1994-2002)
With the following Ranges:
1 White
2 Black
3 American Indian, Aleut, Eskimo
4 Asian or Pacific Islander

PTDTRACE: Demographics- race of respondent (2003 and forward)
With the following Ranges:
1 White Only
2 Black Only
3 American Indian, Alaskan Native Only
4 Asian Only
5 Hawaiian/Pacific Islander Only
6 White-Black
7 White-AI
8 White-Asian
9 White-Hawaiian
10 Black-AI
11 Black-Asian
12 Black-HP
13 AI-Asian
14 Asian-HP
15 W-B-AI
16 W-B-A
17 W-AI-A
18 W-A-HP
19 W-B-AI-A
20 2 or 3 Races
21 4 or 5 Races

PESEX: Demographics-sex
With the following Ranges:
1 Male
2 Female

PRTAGE: Demographics-age top coded at 90 years old
With the following Ranges:
0:90 Range

PTERNHLY: Earnings-hourly pay rate, amount-recode
With the following Ranges:
-1 In Universe, Met No Conditions To Assign
0.0:99.99 Range

HUFAMINC: Household-total family income in past 12 months
With the following Ranges:

-3 Refused
-2 Don't Know
-1 Blank
1 Less Than $5,000
2 5,000 To 7,499
3 7,500 To 9,999
4 10,000 To 12,499
5 12,500 To 14,999
6 15,000 To 19,999
7 20,000 To 24,999
8 25,000 To 29,999
9 30,000 To 34,999
10 35,000 To 39,999
11 40,000 To 49,999
12 50,000 To 59,999
13 60,000 To 74,999
14 75,000 Or More

PEMLR: Labor Force-employment status
With the following Ranges:

-1 Not in Universe
1 Employed-At Work
2 Employed-Absent
3 Unemployed-On Layoff
4 Unemployed-Looking
5 Retired-Not In Labor Force
6 Disabled-Not In Labor Force
7 Other-Not In Labor Force

GESTCEN: Geography-census state code
With the following Ranges:

11 ME
12 NH
13 VT
14 MA
15 RI
16 CT
21 NY
22 NJ
23 PA
31 OH
32 IN
33 IL
34 MI
35 WI
41 MN
42 IA
43 MO
44 ND
45 SD
46 NE
47 KS
51 DE
52 MD
53 DC
54 VA
55 WV
56 NC
57 SC
58 GA
59 FL
61 KY
62 TN
63 AL
64 MS
71 AR
72 LA
73 OK
74 TX
81 MT
82 ID
83 WY
84 CO
85 NM
86 AZ
87 UT
88 NV
91 WA
92 OR
93 CA
94 AK
95 HI

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